(No Model.) 3 Sheets—Sheet 1.

B. A. FISKE.

PRINTING TELEGRAPH.

No. 529,484. Patented Nov. 20, 1894.

Fig. 1.

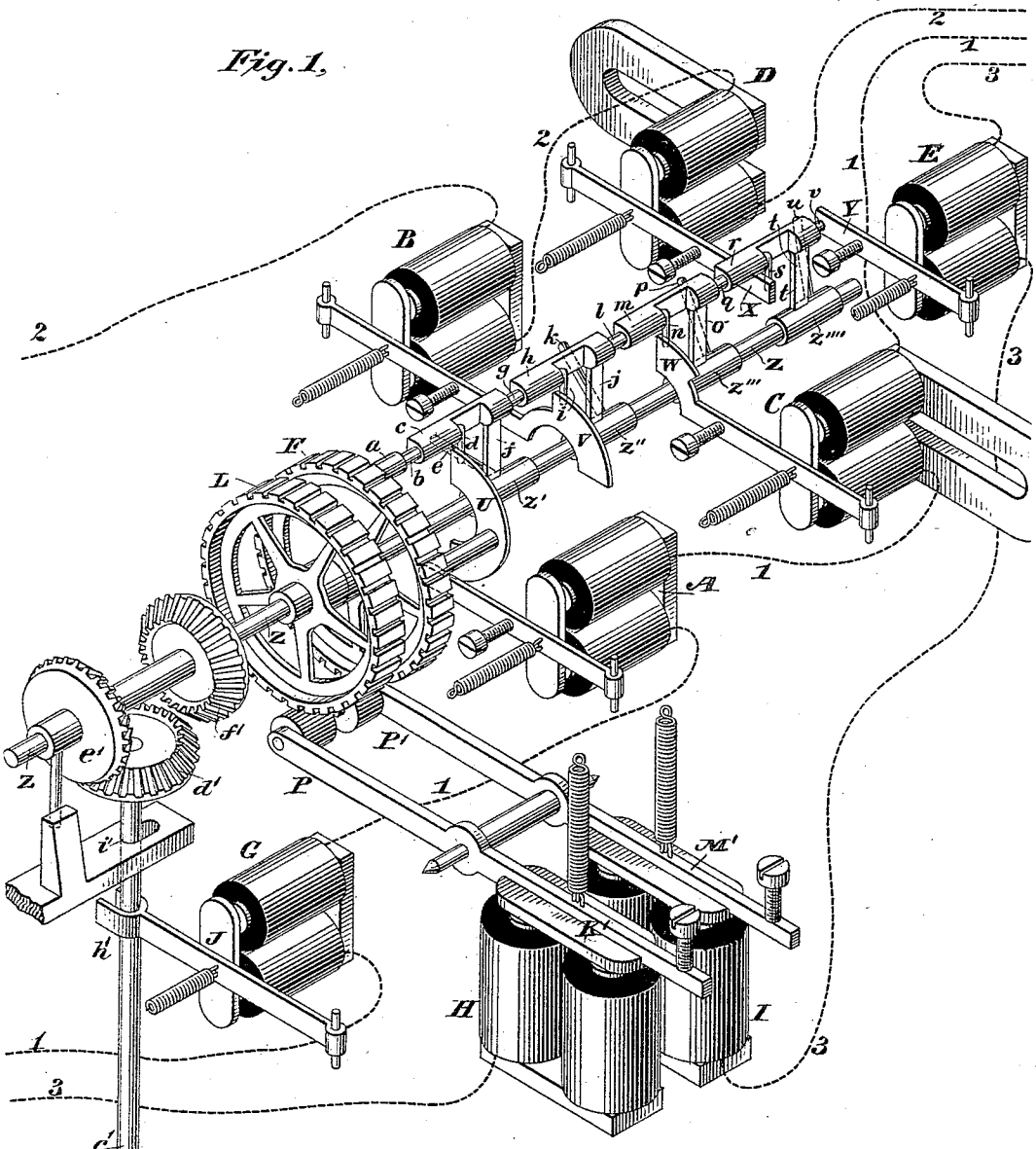
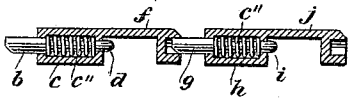


Fig. 7.



Witnesses
Geo. W. Breck
Carrie E. Ashley

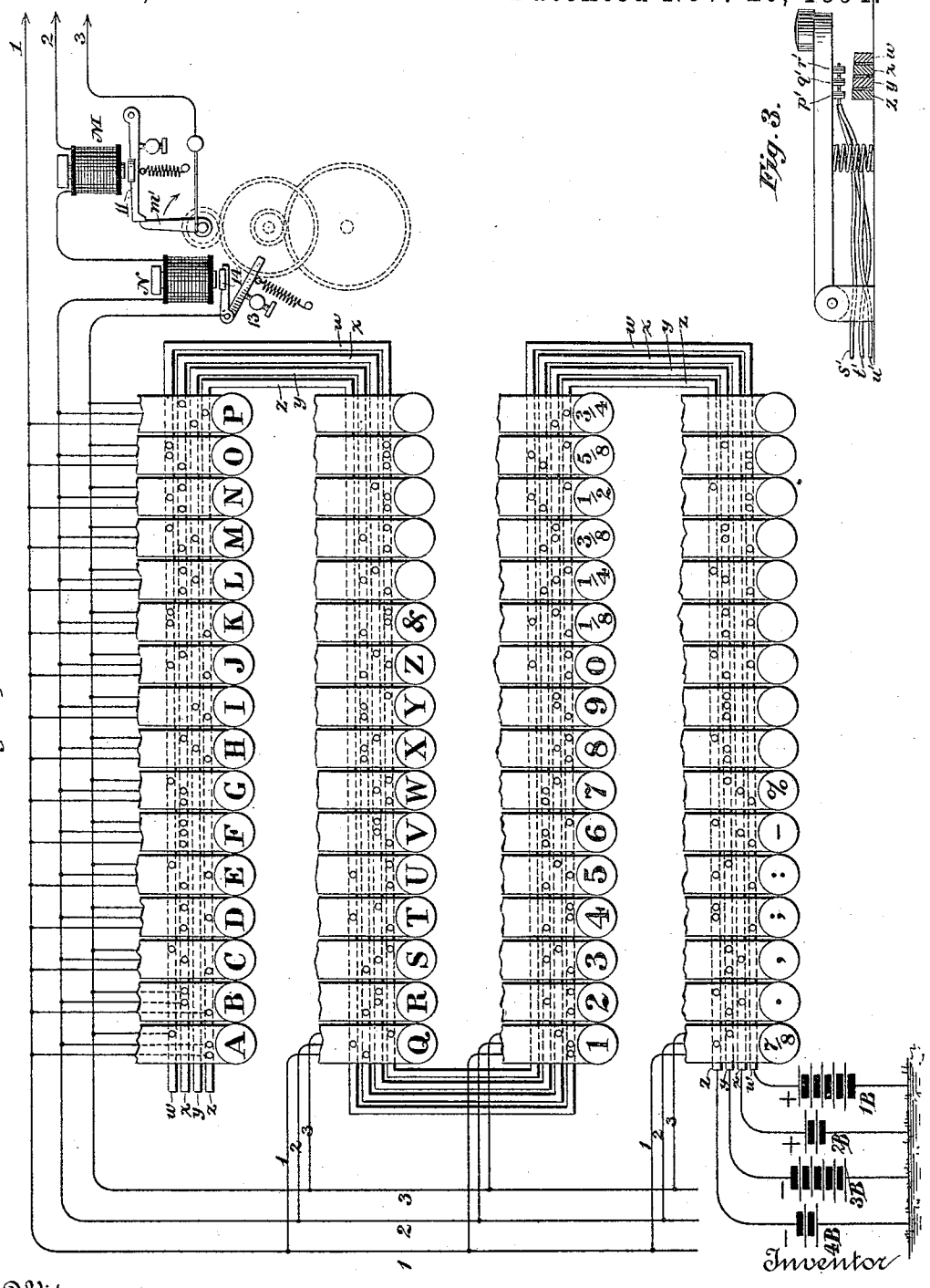
Inventor
Bradley A. Fiske.
By his Attorney
C. A. Buckingham

(No Model.) 3 Sheets—Sheet 2.

B. A. FISKE.

PRINTING TELEGRAPH.

No. 529,484. Patented Nov. 20, 1894.



Witnesses
Geo. W. Breck.
Carrie E. Ashley

Inventor
Bradley A. Fiske
By his Attorney
C. C. Burkinbine

(No Model.)

3 Sheets—Sheet 3.

B. A. FISKE.

PRINTING TELEGRAPH.

No. 529,484. Patented Nov. 20, 1894.

Fig. 6.

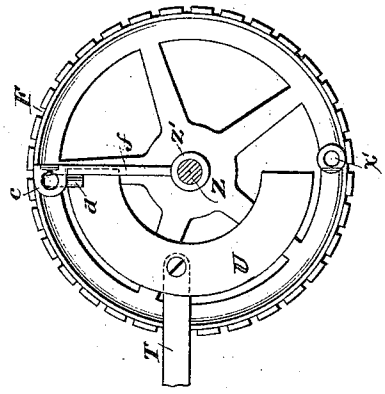


Fig. 5.

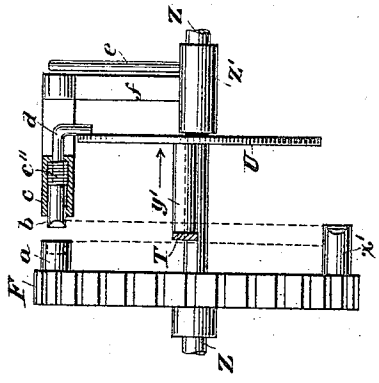
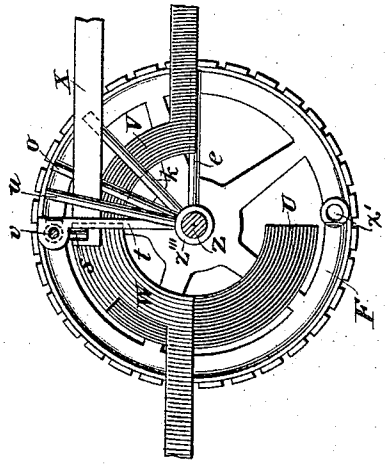


Fig. 4.



Witnesses
Geo. W. Breck.
Carrie E. Ashley

Inventor
Bradley A. Fiske.
By his Attorney
C. K. Breckinridge

UNITED STATES PATENT OFFICE.

BRADLEY A. FISKE, OF THE UNITED STATES NAVY, ASSIGNOR TO THE WESTERN UNION TELEGRAPH COMPANY, OF NEW YORK, N. Y.

PRINTING-TELEGRAPH.

SPECIFICATION forming part of Letters Patent No. 529,484, dated November 20, 1894.

Application filed October 13, 1888. Serial No. 287,998. (No model.)

To all whom it may concern:

Be it known that I, BRADLEY A. FISKE, of the United States Navy, a citizen of the United States of America, temporarily residing at the New York Navy-Yard, have made a new and useful Improvement in Printing-Telegraphs, of which the following is a specification.

My invention relates to improved means for advancing a type-wheel or other similar device to a proper position to print, which consists in the application to a type-wheel of a series of adjusters, they being independent each in respect to all the others, in the sense that they may be operated singly, and the type-wheel rotated spaces determined by their respective degrees or limits of movement, while if several be brought into action, the type-wheel will be rotated spaces in each case equal to the collective component movements.

It is also characteristic of my invention that each adjuster shall have a range of action different from that of the others, and so proportioned that by operating the adjusters singly, in twos, threes or other combination, every character upon the wheel may be brought into position for printing, a different character in each instance being selected. Thus, in case of a type-wheel having thirty-two spaces upon its periphery, the five adjusters are preferably given limits of action, represented respectively by one, two, four, eight and sixteen of said spaces; and when operated singly they serve to bring the first, second, fourth, eighth, and sixteenth characters over the impression device, while by working the adjusters in combinations of two, the third, fifth, sixth, ninth, tenth, twelfth, seventeenth, eighteenth, twentieth and twenty-fourth will likewise be adjusted. The adjusters actuated in combinations of three, also turn the type-wheel to the seventh, eleventh, thirteenth, fourteenth, nineteenth, twenty-first, twenty-second, twenty-fifth, twenty-sixth and twenty-eighth characters, while if operated in combinations of four, or all together, the remaining characters upon the wheel will be selected.

My invention also consists in various details of construction hereinafter set forth.

I will now explain my invention by reference to the accompanying drawings, which represent one method of carrying it into operation.

Figure 1 is a perspective view of my improved printer. Fig. 2 is a diagram of the transmitting mechanism. Fig. 3 is a single key showing the arrangement of its multiple contacts. Fig. 4 represents a side view of the type-wheel and a portion of the controlling apparatus. Fig. 5 represents a front view of the type-wheel and controlling mechanism by which the type-wheel is rotated through one hundred and eighty degrees at a step. Fig. 6 is a side view of the same. Fig. 7 represents the latching apparatus by means of which the type-wheel is permitted to rotate to position to print, and through the agency of which, after the operation of printing, the type-wheel is returned to its zero position.

In the printer here shown, two type-wheels L, F are rigidly connected to shaft Z, and two independent press levers P, P′ are employed, which are operated one by positive and the other by negative currents, through the agency of armatures K′, M′ and polarized magnets H, I, the latter being placed in main line 3. Upon the shaft Z is also keyed a sleeve to which are rigidly fixed bevel-wheels e', f', with which wheel d' is made to engage to rotate the type-wheels forward or backward as occasion may require.

d' is mounted upon the upper end of shaft c' which communicates with any suitable motive power through gearing b', a' and is given a to-and-fro movement within the slot i' through the agency of the magnet G, armature J, and the armature lever having a forked end h'. When armature J is attracted, d' is brought into gear with f' and the type-wheels are given a forward rotation, providing the releasing mechanism hereinafter to be described has first been operated, and upon its backward movement when current upon line 1 is discontinued wheel d' engages with e' and the type-wheels are then returned from any position in which they may have been placed to their normal or zero point. It will also hereinafter be shown that upon the depression of each and every transmitting key to adjust the type-wheel to print, a current is sent over line 1 sufficient to cause G to attract J, and bring d' into gear with f'.

The type-wheel adjusters are brought into action by five electro-magnets, A, B, C, D, E, of which C and D are polarized while the others are neutral. Magnets G, A and C are included within main line 1, and B and D are placed in line 2, while neutral magnet E, and the polarized printing magnets H, I are placed in line 3. With the movable parts of the adjusters in the position shown in Fig. 1, if wheel d' were thrown into gear with f' the type-wheels would not be rotated because they would be firmly held, by said adjusters, against the action of the motor. As will be seen, arm t is locked by pin v placed at the end of armature lever Y. Likewise pin q locks arm O against rotation, while pin l prevents rotation of arm $l^{\times}$, pin g rotation of arm f, and pin b rotation of wheel F. Arms f, j, o, t, are rigidly attached to sleeves z', z'', z''', z'''', and to these sleeves are also attached radial arms e, k, p, u, forming angles with the arms of the first series as follows: e with f ninety degrees, k with j forty-five degrees, p with o twenty-two and one-half degrees, and t with u eleven and one-fourth degrees—one thirty-second of a circumference—which is the space occupied by one character upon the type-wheel. Arms f, j, o, t, are provided, respectively, with horizontal extensions c, h, m, r, having thimble openings which serve as bearings or supports for stop pins b, g, l, q. These pins, like b shown in Figs. 5 and 7, are provided with spiral springs c'', normally tending to press them to the left within their journal bearings, and, in each instance, into the path of the corresponding one of the series of arms f, j, o, t. As here shown, b is normally pressed into the depression in the end of pin a, g into the path of f, l into the path of j, and q into the path of o; and, at the same time, armature lever Y being normally in a retracted position, pin v is in the path of arm t. It is now seen that the degrees or limits of action of the several adjusters are represented by the angles between corresponding arms of the two series, the limits of the first adjusters being eleven and one-fourth degrees, the second twenty-two and one-half degrees, the third forty-five degrees, the fourth ninety degrees, and the fifth one hundred and eighty degrees, the angular distance between the pins a and x' upon the type-wheel; and that these angular spaces, when added together, represent the entire range of movement of the type wheel, and that, by the simultaneous operation of all the adjusters, the last character upon the wheel is adjusted to position, while any other character may be presented to the press by some one or more of the several adjusters at a single operation, that is to say, without repeating the operation of any one of the adjusters, thus enabling the type-wheel to be rotated to position at a bound, and within the space of time required to send a single impulse to line.

The armature levers of adjuster magnets A, B, C, are each provided with curvilinear extension pieces U, V, W, in order that the pins b, g, l, may be actuated at any point of their range of rotation which they may happen to occupy, and this will be rendered apparent by the following: If, in the operation of the first adjuster of the series, pin v were to release arm t, the entire system of adjusters with the type-wheel would rotate the space of one character and there be arrested by arm u; likewise, in respect to the second adjuster, if pin q released arm o of the adjuster, the system, including arm o, the type-wheels and all between would rotate an additional space of two characters, and arm p would be brought against pin q; and if l released j of the third adjuster, the type-wheels and arm j and intermediate releasing mechanism would rotate through a further space of four letters, while the operation of the next or fourth adjuster would cause the type-wheels to rotate an additional space of eight characters, making in the aggregate a rotation of fifteen characters, or nearly one-half a revolution. The arm f, after the operation of the first four adjusters of the series, would occupy a position almost diametrically opposite that shown in Fig. 1, while pin b of the fifth adjuster would still engage and lock lug a. To enable the armature lever of magnet A to operate the fifth adjuster while in such a position, that is to say, with arm f and pin a removed nearly one hundred and eighty degrees from their normal location, it is provided with a curvilinear extension of substantially one hundred and eighty degrees in length as shown in the drawings. In the case of the fourth adjuster the limit of rotation of arm j is within ninety degrees, wherefore the curved extension of the armature lever may be correspondingly shortened; while in case of the third adjuster, the extension of the armature lever need not exceed forty-five degrees. The range of movement of arms o and t being only slight, curved extensions of the armatures are rendered unnecessary. If, after all of the first four adjusters have been operated, pin b of the fifth be released, the type-wheels will then be given a full one-half additional rotation, and will at the end of such movement be arrested by a pin x', which is longer than a, and is placed upon the type-wheel diametrically opposite the latter; and owing to its greater length stop x' will engage pin b even when the latter is in a retracted position. Again, if the type-wheel and adjusters were in their normal positions, and releasing pin b were alone withdrawn, the type-wheel would make a one-half rotation as before, but the locking arms f, j, o, t, would remain in the position shown in Fig. 1; and if locking pin q were alone operated, arm f with the type-wheels would partake of ninety degrees rotation; and so on throughout the series. The releasing pins, and the cup-shaped openings in the arms with which the pins engage, are constructed as shown in Fig. 7; and by this means, if the type-wheels have been advanced to a posi-

tion to print, spur-wheel d', upon engaging with wheel e', will rotate the type-wheels to their initial position, and the cup-shaped openings within the end of pin a, and arms f, j, o, t, will close over the ends of their corresponding pins, the latter being thrust within the openings in each case by springs similar to c''. Shown in Fig. 5. The backward movement of the type-wheel is limited by a fixed stop upon the frame of the machine which causes it to be arrested in the position shown in Fig. 1, and securely held against the action of the driving motor whose force is applied through wheels d' e'.

It would be difficult if not impossible to define "adjuster" by reference to specific parts of the apparatus shown in the drawings without imposing a meaning too narrow to clearly cover the invention. It may be observed, however, that in this particular form of apparatus each adjuster consists of two arms and a latch which releases one arm and arrests the other, the arms being driven from one position to the other by any suitable motor. Taking for example, the adjuster which is called into action by electro-magnet C, there is an arm j, which at the front limit of action is released by a latch l, the latter serving to also arrest arm k at a point defining the second limit of movement. Rotation of this adjuster as well as of the others is positively imparted by a friction shaft Z through the agency of any suitable motor. A separate motor, for each adjuster, however, might, if desired, be employed. Of course the same end might be accomplished by mechanism for positively driving the type carrier from one limit to another, there being a series of adjusters so that by actuating them collectively the wheel might be moved to any required position by not more than a single action of each adjuster. My invention, however, is not limited to this instance of an "adjuster." On the contrary, it broadly covers any device for actuating the type carrier through a component of its entire movement, there being a series of such devices whose limits of action collectively are commensurate with the maximum range of operation.

In the operation of printing every character, electro magnet G must be brought into action in order that the motor may be applied to rotate the type-wheels, and one or the other of the polarized press-magnets H, I must be actuated to take an impression, while electro-magnets M, N at the transmitter, placed in line 2, must also be brought into operation for the purpose of closing line 3, the latter being normally broken, as a condition precedent to the operation of the press mechanism. Thus it is seen that, independently of the adjuster magnets which cause the type-wheel to rotate, one or more electro-magnets in each of the main lines 1, 2, 3 are brought into action at the printing of each character, and to this end batteries of different strength and polarity are employed by which a current may be sent over each of the three main lines, without actuating any one of the adjuster magnets, or such current may be employed as will actuate one of the adjuster magnets upon any one of the lines. Likewise currents may be sent by which any number of the adjusting magnets may be operated as well as G, H, I and M, N. In line 1, magnet G must be actuated at the printing of each character, and it must be capable of operation to the exclusion of magnets A and C, or either of them, and currents must also be employed which will work magnets G and C to the exclusion of A; also magnets G and A to the exclusion of C. These conditions are obtained by employing a weak negative current from battery 4^B (Fig. 2) which will operate magnet G to the exclusion of A and C. The weak positive current from battery 2^B is likewise sufficient to work magnet G, and is also of the right polarity to operate magnet C, but is not strong enough to energize magnet A. Again a strong negative current will operate magnet G and is sufficient to energize magnet A, but is of the wrong polarity to affect magnet C; while a strong positive current will operate magnets G and A and is of the right polarity to actuate magnet C. Thus, by a strong positive current, all of the magnets G, A and C of line 1 are actuated; magnets G and A respond to a strong negative current, and magnets G and C respond to a weak positive current, while only magnet G is actuated by a weak negative current. In line 2 magnets M, N at the transmitting station correspond with magnet G of line 1, and the same order of currents is employed in line 2 as in line 1. Magnets M, N are operated to the exclusion of the others by a weak negative current, and magnets M, N and D are operated to the exclusion of B by a weak positive current. Again magnets M, N and B are operated to the exclusion of D by a strong negative current, while all are operated by a strong positive. In line 3 magnet E is operated only by a strong current, while magnet H is energized either by a strong or weak positive, and magnet I by a strong or weak negative. If, therefore, a weak positive current is transmitted over line 3, only the armature of magnet H will respond, and if a weak negative is sent to line, only the armature of magnet I will be operated. Magnet I does not respond to a positive, nor does magnet H to a negative current, while magnet E is not operated by a weak current, either positive or negative. If, however, a strong positive current is transmitted, the armatures of magnets H and E are operated, but not that of magnet I; also if a strong negative current is transmitted, the armatures of magnets I and E will be operated, but not that of H.

In printing telegraphs, the press mechanism should be so timed as not to be brought into action until the type-wheel has been adjusted to proper position for printing. To this end line 3 is normally broken, and mech-

anism is employed at the transmitting station by which it can be closed only after the necessary currents have been transmitted over the lines for the purpose of bringing the type-wheels to the required position for printing. Magnet M controls armature 11, and N armature 14. Arm m' is under a constant tendency to rotate and while, upon the transmission of a current of either polarity whether weak or strong, it is released; and at the same time armature lever 14 interposes a stop in the path of its rotation. Arm m' when arrested in its second position completes circuit 3 and so maintains it during the continuance of the current thereon. When, however, the current upon line 2 is broken or removed, armature 14 is retracted, and the arresting stop by which arm m' was caught permits it to continue rotation until again arrested by armature 11, the latter having previously returned to its back position. From this explanation it will be seen that no current whatever can be transmitted over line 3 until a current to actuate magnets M, N has first been transmitted over line 2. This arrangement, permitting the adjusters to operate somewhat ahead of the press devices, does not serve such a purpose in respect to adjusting electro-magnet E, since magnet E is in the same circuit with press magnets H, I. It will, however, be observed that the operation of the releasing mechanism controlled by magnet E only permits the movement of the type-wheels through the space of one character, and this movement, being short, is accomplished before magnets H, I can overcome the inertia of the press mechanism and complete the operation of printing.

In Fig. 2, 1^B, 2^B, 3^B, and 4^B, are four separate and distinct batteries from which, respectively, strong positive, weak positive, strong negative and weak negative currents are obtained. Battery 1^B is joined to a metallic strip w extending throughout the keyboard of the transmitter, while x, y, and z, are similar strips respectively connected with batteries 2^B, 3^B, and 4^B. 1, 2, 3, represent the main lines of the system, and each key of the transmitter is permanently joined with said three lines by branches s', t', u', as shown in Fig. 2. Each key is also provided with contact points so arranged as to join the three lines to such of the four batteries as may be necessary; and all three lines are in certain cases joined to a single battery, while in others each line is joined to a separate battery. For example, upon the depression of key A, lines 1 and 2 are joined with battery 4^B, while line 3 is connected to battery 1^B. Upon the depression of key B, battery 4^B is joined to line 1, and battery 2^B to lines 2 and 3.

In Fig. 3 the key is shown provided with three contact stops p', q', r'. These contact pins for the various keys are represented throughout Fig. 2 by small circular marks, and in each case the one at the extreme left is joined with line 1, the one at the right to line 3, while the intermediate one is connected to line 2.

In order to show in each case what currents are employed, and what particular magnets are brought into action, in the process of printing the several characters upon the type-wheel, I have prepared the following table, in which the column at the extreme left under the heading "Type-wheel characters" represents the characters upon the letter wheel, while the next column to the right, under the heading "Magnets which are brought into action" specifies, first, the adjuster magnets which determine the extent of type-wheel rotation; second, the press magnet employed; third, the magnet which brings the motor into position for rotating the type-wheels, and, fourth, the magnets at the transmitting station which control apparatus for closing line 3 preceding each impression. The three columns at the right of the table show the currents which are employed upon the three lines in the operation of printing each of the entire series of characters. It will thus be seen that each horizontal line of the table indicates the character to be printed, the magnets brought into action, and the current employed upon each of the three lines.

Type-wheel characters.	Magnets which are brought into action.	Line No. 1.	Line No. 2.	Line No. 3.
A	E H G M N	Weak −	Weak −	Strong +
B	D H G M N	Weak −	Weak +	Weak +
C	D E H G M N	Weak −	Weak +	Strong +
D	C H G M N	Weak +	Weak −	Weak +
E	C E H G M N	Weak +	Weak −	Strong +
F	C D H G M N	Weak +	Weak +	Weak +
G	C D E H G M N	Weak +	Weak +	Strong +
H	B H G M N	Weak −	Strong −	Weak +
I	B E H G M N	Weak −	Strong −	Strong +
J	B D H G M N	Weak −	Strong +	Weak +
K	B D E H G M N	Weak −	Strong +	Strong +
L	B C H G M N	Weak +	Strong −	Weak +
M	B C E H G M N	Weak +	Strong −	Strong +
N	B C D H G M N	Weak +	Strong +	Weak +
O	B C D E H G M N	Weak +	Strong +	Strong +
P	A H G M N	Strong −	Weak −	Weak +
Q	A E H G M N	Strong −	Weak −	Strong +
R	A D H G M N	Strong −	Weak +	Weak +
S	A D E H G M N	Strong −	Weak +	Strong +
T	A C H G M N	Strong +	Weak −	Weak +
U	A C E H G M N	Strong +	Weak −	Strong +
V	A C D H G M N	Strong +	Weak +	Weak +
W	A C D E H G M N	Strong +	Weak +	Strong +
X	A B H G M N	Strong −	Strong −	Weak +
Y	A B E H G M N	Strong −	Strong −	Strong +
Z	A B D H G M N	Strong −	Strong +	Weak +
&	A B D E H G M N	Strong −	Strong +	Strong +
	A B C H G M N	Strong +	Strong −	Weak +
	A B C E H G M N	Strong +	Strong −	Strong +
	A B C D H G M N	Strong +	Strong +	Weak +
	A B C D E H G M N	Strong +	Strong +	Strong +

A similar table, with a slight modification of the preceding, could be made representing the operation of the system in printing from the figure wheel, by substituting I for H, in the column under the heading "Magnets which are brought into action," and − for + in the third column in each instance.

As already seen, in case of a type-wheel having thirty-two character spaces, five adjusters should be employed whose limits of rotation are represented by the geometrical progression, or series, one, two, four, eight

and sixteen. A type-wheel having sixty-four character spaces should be actuated by six instead of five adjusters, and the range of action of the last should be equal to thirty-two spaces.

It is apparent that, with a given number of adjusters whose limits of rotation are made to correspond with the terms of a series arranged in geometrical progression, with a ratio two, a type-wheel having the maximum number of characters may be manipulated. For example, by means of the fifth adjuster alone, the type-wheel is turned sixteen spaces, while by the combined action of the first, second, third and fourth, it is rotated fifteen; and it is found that there are fifteen possible combinations that may be derived from said four terms forming a series, one, two, three, &c., to fifteen. Such being the case, it is obvious that if the fifth term were made less than sixteen, say thirteen, only twelve of the possible fifteen combinations could be utilized, and to this extent the number of positions to which the type-wheel could be operated would be reduced by three, and thus with five adjusters only twenty-eight instead of thirty-one characters could be printed. On the other hand, no term of the series representing the extent of adjuster action can be made more than twice as great as the preceding, for a part of the wheel equal to the difference between one term and twice the preceding one could not be adjusted to position for an impression. The extent of action of an adjuster may be less than twice the amount of movement of the preceding one; but the extent of action of any one adjuster cannot be more than twice as great as that of the one preceding it.

In the above description, together with the drawings, I have set forth the best method with which I am acquainted of giving my invention concrete form; but I do not desire to limit myself to such arrangement, as many others may be adopted without departing from the essential features of the invention.

It is characteristic of my invention, in connection with the many forms which it may take, in the series of adjusters, if five are used, for determining the movement of the type-wheel, the last one or the fifth of the series normally holds the type-wheel at its initial or zero point, while such adjuster is normally held in an initial position by the next or fourth one of the series, and so on throughout the series, the fourth being normally held at zero by the third, the third by the second and the second by the first. It is, of course, apparent that the adjusters need not be placed in the machine with the one determining long step rotation as the last one of the series and the one controlling rotation of one character only as the first, with the others placed between in the order of the amount of the rotation which they cause.

As a consequence of the foregoing construction the type-wheel, with all of the adjusters, are normally locked together, while upon the operation of the short step adjuster, the type-wheel and other adjusters remain locked together and are rotated the space of one character. If the second adjuster instead be operated, the first adjuster will remain in its normal position, while the type-wheel locked with all the others will rotate the space of two characters. Likewise if the third adjuster were alone operated, the first two would remain in their normal position, while the type-wheel locked with the fourth and fifth would rotate the space of four characters. In the same manner if the fourth mechanism were alone operated, the three preceding ones would remain in their normal position, while the type-wheel locked with the fifth would rotate the space of eight characters. The adjusters may be operated in succession in either direction throughout the series, from first to fifth or from fifth to first, or they may be worked promiscuously or all together, and in every case will their combined actions cause an amount of type-wheel rotation equal to the sum of movements due to the several adjusters which are brought into action. It is, however, not indispensable to the carrying out of my invention that the adjusters be capable of simultaneous action, but only that they be capable of operation in such manner that rotation or movement imparted to the wheel or other type carrying device by any one adjuster be made to supplement that due to others, to the end that any particular character may be brought to position by a single operation of each of the several adjusters, whatever the number employed.

I have shown three main line wires for controlling the various magnets of my printer, though I do not limit myself to such an arrangement, as any number of circuits with suitably modified transmitting and receiving apparatus may be used. In this connection it is only necessary that the receivers be so devised as to enable their respective operations without interference, one with the others. Nor do I wish to limit myself to the use of a clock or other motor to give the type-wheel forward and return movement, nor to a type-wheel having a reciprocating action.

As shown in the drawings, two type-wheels are represented but only one may be used. I have also shown printing magnets placed in the same lines with adjuster magnets; but many different methods of effecting impressions, well known in the art, may be adopted.

What I claim, and desire to secure by Letters Patent, is—

1. In a printing telegraph, the combination of a type carrying device, a series of adjusters each of which independently of the others and independently of the press mechanism, moves said type carrying device to a position for printing, said spaces of adjustment collectively being commensurate with its maximum range of movement.

2. In a printing telegraph, the combination of a type-wheel, a series of independently rotating adjusters whose limits of action collectively are commensurate with the maximum movement of said type-wheel.

3. In a printing telegraph, the combination of a type-wheel and a series of independently rotating adjusters having movable limits of action for giving the type-wheel movements represented respectively by the terms of the series 1, 2, 4, 8, 16 &c., the sum of which equals the maximum movement of the wheel.

4. In a printing telegraph, the combination of a type wheel, a series of independently rotating adjusters, having rotating or movable limits of different lengths of action which are capable of operating singly, all together or in any desired combination, and which collectively are commensurate with the maximum range of type-wheel rotation, and a corresponding series of adjuster electro-magnets.

5. In a printing telegraph, the combination of a type-wheel, a series of interlocking adjusters engaging with one another and the type-wheel, the last of the series holding the type-wheel in an initial position, while it is in turn held by a second, and the second by a third, and the third by a fourth, and so on throughout the series, and a series of adjuster magnets substantially as described.

6. In a printing telegraph, the combination of a type wheel, a series of independent adjusters whose combined limits of action are commensurate with the maximum movement of the wheel and which are normally locked together forming a rigid connection throughout the series between the first adjuster and the type wheel, and a series of adjuster electro magnets for operating the adjusters one at a time or all together.

7. In a printing telegraph, the combination of a type-wheel F, shaft z, radial adjuster arms f, e, loosely mounted upon said shaft, latching devices a, b, electro-magnet A, adjuster arms j, k, loosely mounted upon shaft z, latching device z for releasing f and arresting e, electro-magnet B for operating said latching device, arms o, p loosely mounted upon said shaft, latching device l for releasing arm j and arresting arm k, and electro-magnet C for operating the same, and other similar devices going to make up the series of adjusters for determining the type-wheel rotation.

8. The combination of shaft z, a type-wheel connected thereto, arms e, f loosely mounted upon said shaft, latch b, adjuster magnet A, and curved extension U of its armature lever.

9. In a printing telegraph, adjusters and press mechanism in combination with two type-wheels, three main lines, the first, which is normally closed, including a magnet to determine the direction of rotation of the type-wheel, and two adjuster magnets, the second, also normally closed, two adjuster magnets, and magnets at the transmitter operating to close the third line as a condition precedent to printing, and the third, which is normally open, two press magnets, and one adjuster magnet.

10. In a printing telegraph, a series of adjusters operative singly or together to rotate a type wheel to any desired position by the single action of each, and press mechanism in combination with a type wheel, and three main lines, the first and second each including two adjuster magnets, and the third both adjuster and press magnets.

BRADLEY A. FISKE.

Witnesses:
WM. ARNOUX,
GEO. H. FEARONS.